

DUAL FUNCTION POLYMER-DERIVED NON-OXIDE/OXIDE MATRIX PREPARED BY ADDITIVE MANUFACTURING

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A nanolayer-at-a-time additive manufacturing approach is employed to create a dense matrix of polymer-derived ceramics around fiber bundles of silicon carbide. Thin ultrathin films pyrolyze quickly without cracks with a cycle time of about one minute. The polymer precursor for SiCN is mixed with a precursor of hafnium oxide, which produces a matrix containing a fine dispersion of hafnium silicate. The oxide/nonoxide matrix leads to both good mechanical properties as well as remarkable oxidation resistance.